

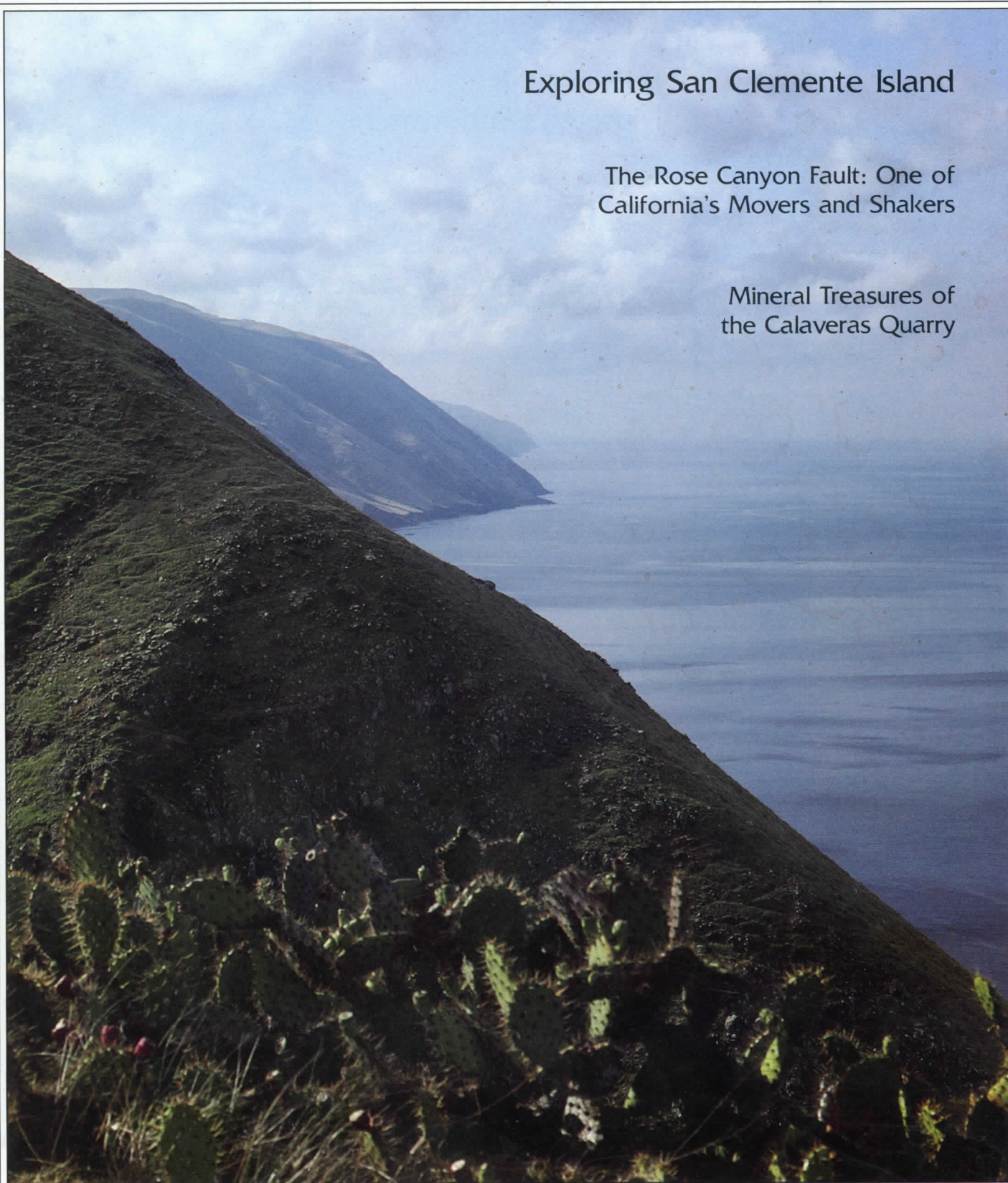
# ENVIRONMENT SOUTHWEST

SAN DIEGO NATURAL HISTORY MUSEUM

## Exploring San Clemente Island

The Rose Canyon Fault: One of  
California's Movers and Shakers

Mineral Treasures of  
the Calaveras Quarry





# Exploring San Clemente Island

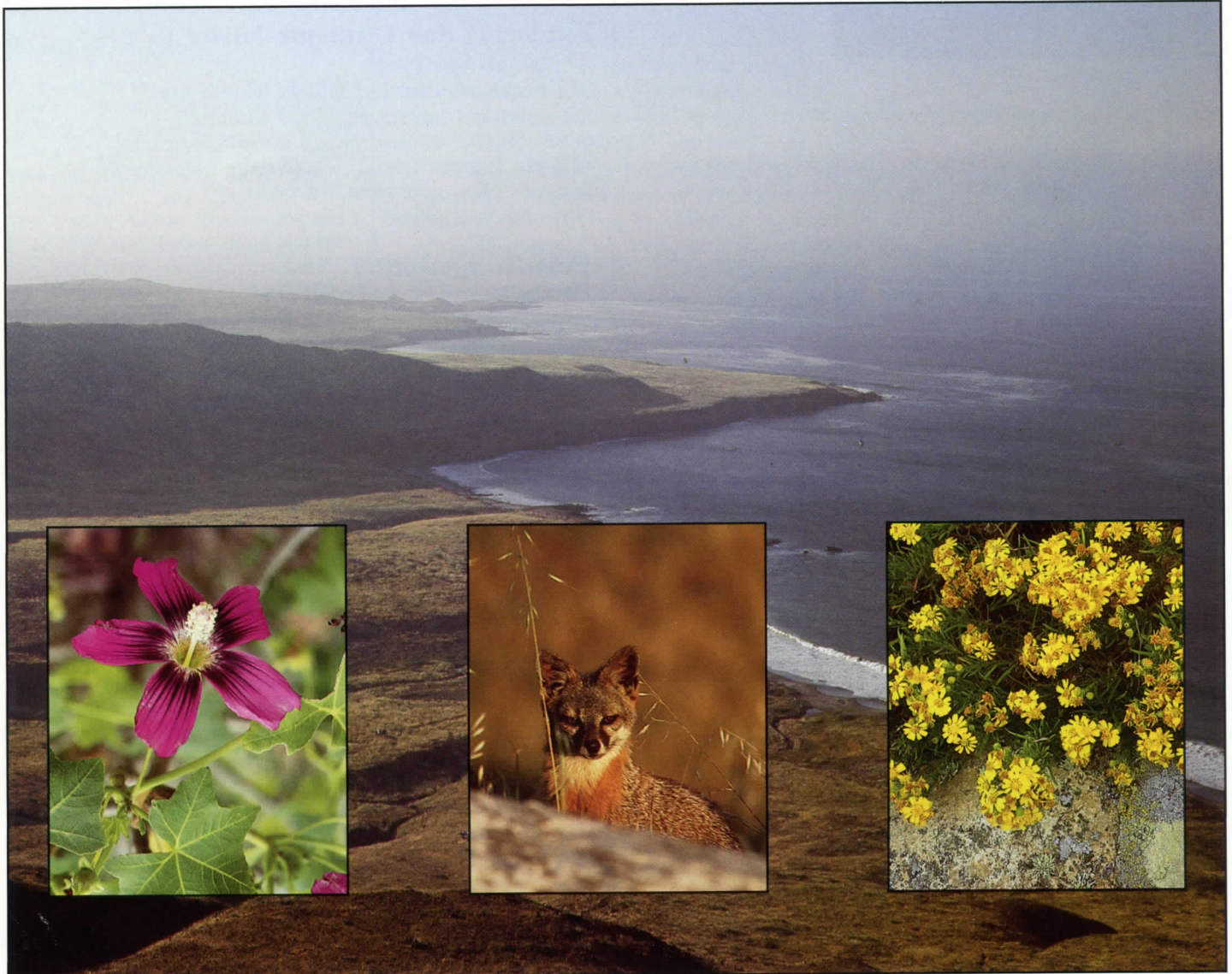
A small world with a character all its own

Text and photos  
by Thomas A. Oberbauer

Once while I was flying out of Los Angeles International airport on a late afternoon in August, the low sun turned the ocean into a vast sheet of glistening gold. Six of the California Channel

Islands came into view. They appeared black and jagged, etched onto the golden surface. I was enthralled. Islands have a special fascination for most people due to their isolated nature and unique environment. To those trained in biology, islands have the additional attractions of marine wildlife and a potential for

unique vegetation. The California Channel Islands maintain this appeal even though they are close to a heavily populated region and have suffered a variety of human and animal abuses. A special feature of the Southern California islands is their individuality. Each has a completely different character: a visit to one



Some areas of San Clemente Island, such as Pyramid Cove at the southern end (background photo) appear harsh and forbidding. But the island is home to many species of plants and

animals, including (inset, left to right) the *Malva rosa*, the San Clemente Island fox, and the Island tarweed.



does not necessarily prepare one for the environment of the others.

### SAN CLEMENTE ISLAND

San Clemente Island lies approximately due west of La Jolla, although it is actually closest (50 miles) to the Palos Verdes Peninsula near Los Angeles. San Clemente Island has a simple physical form: it is 21 miles long, narrow, but wedge-shaped, and points in a northwesterly direction. Topographically, the island rises gradually from the north to a plateau-like southern half. The western slopes rise in a series of terraces, cut by long, narrow and deep canyons. The eastern slope is a nearly sheer scarp, dropping 1,965 feet from the highest point to the ocean in a very short distance. The eastern side also has very deep, but short, canyons.

From the upper slopes, the island has an austere appearance with an uncomplicated combination of colors: golden grass, gray fog and blue sky and ocean. In winter, the island is a solid soft green, cool and foggy.

San Clemente Island has been occupied by humans for thousands of years. The Gabrielino Indians used the area extensively, as exhibited by numerous archaeological sites. The majority of the sites are shell middens (refuse heaps). Tools for harvesting marine mammals, and even burial sites, indicate extended periods of native habitation, although no good permanent water source exists.

Following settlement of Southern California, San Clemente Island was used for cattle and sheep ranching. Prior to this, in the early to mid-1800s, goats were introduced to the island, presumably by early mariners. Currently the island serves as part of the U.S. Naval Defense system. A large runway lies diagonally across the northern end, below the prevalent summer fog layer. The southern end of the island has been used extensively for target practice, which is currently confined to a small

area. San Clemente Island has been a navigational hazard in the past, a fact corroborated by the number of ship wrecks lying around it.

### CLIMATE AND TOPOGRAPHY

San Clemente Island's large size and topographic variability have created a

island, dropping over the steep scarp on the eastern side and plunging downward like a huge waterfall.

Strong winds can occur any time of the year on the upper slopes due to the island's position, and sleet and hail occasionally occur on the island. During Santa Ana winds, the air over the main-



*Vegetation is more abundant on steep hillsides and in canyons, such as Eagle's Canyon, because they were less accessible to the feral goats.*

variety of climates. The northern end receives only six inches of rainfall a year, while the central highlands receive nearly twice that amount. The driest portion of the island is the southern end. Patterns of rainfall and temperature are similar to those of the mainland, but fog is more prevalent on the island. Spring fogs are common on the upper slopes; however, during summer the upper portion of the island is frequently above the inversion layer and may be 12 to 24 degrees warmer than the cloud-shrouded lowlands. One spectacular feature can be seen by standing above the inversion layer and watching the afternoon fog cascade over the northern part of the

land may be clear and dry, but air pollutants from Los Angeles and Orange County may be pushed offshore only as far as San Clemente Island and there remain until an onshore flow recurs.

The island is composed of Miocene volcanic rocks (13 to 16 million years old) with younger sediments overlying them. In several locations these sediments contain deposits of fossil marine animals. Certain iron-rich soil types imply the presence of pines on the island in the geologic past, although the island probably was never connected to the mainland. The height of the wave-cut terraces indicates, however, that the island was nearly submerged at various times.

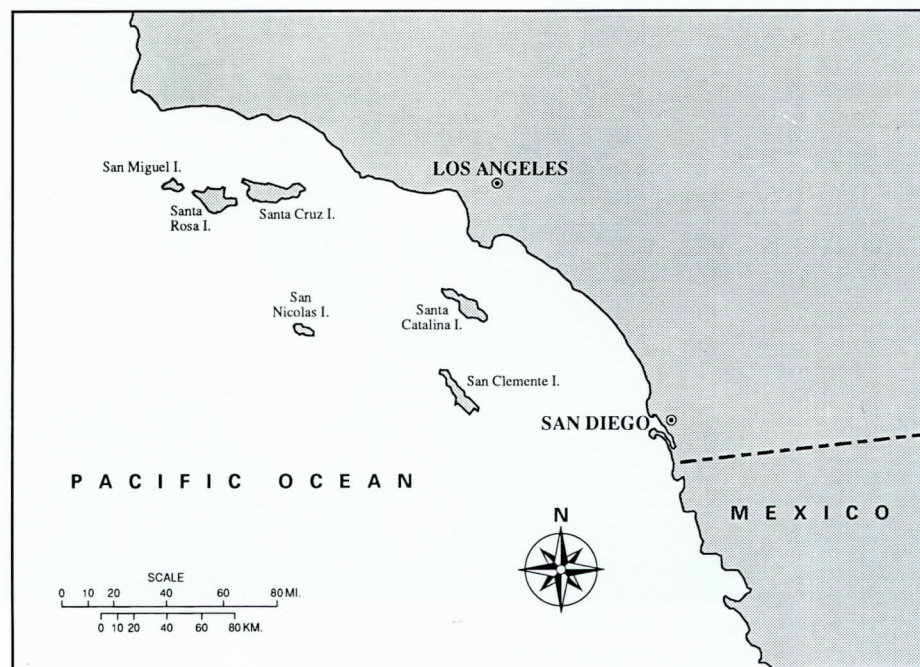


## VEGETATION

The modern-day vegetation on San Clemente Island is the result of intense goat grazing for the last 100 to 150 years; sheep ranching and the associated accidental introduction of non-native weeds have also made their marks. The top plateau of the island is an open, grassy plain with heavy clay soil. Most species in this community are introduced Mediterranean grasses; yet significant stands of native *Stipa*, a perennial bunchgrass, grow there. Moreover, a number of herbaceous natives occur there, including

canyons as well as the bottoms of the large western canyons support a woodland, but it has been gradually dying as the goats have persisted on the island. Goat grazing and browsing have prohibited the reproduction of these woodland species so that even the youngest individuals are more than 70 years old.

Vast areas of the southern part of the island are covered with coast cholla cactus (*Opuntia prolifera*) or are completely barren due to goat grazing. Usually these barren areas are deeply eroded, and erosion troughs and underground erosion tunnels are common on the island.



San Clemente Island lies nearly due west of La Jolla.

goldfields (*Lasthenia chrysostoma*), gilia (*Gilia nevinii*), sanicles (*Sanicula crassicaulis* and *S. pinnata*), lupine (*Lupinus guadalupensis*), a minute annual in the phlox family (*Linanthus pymaeus*) and, in a few places, the endemic San Clemente Island brodiaea (*Brodiaea kinkiensis*).

Because of goat grazing, the steep walls of the canyons and the steep eastern scarp have become refuges for plants that were once more widespread. The south-facing slopes on the main western canyons are mostly cactus-covered, but they also support a few other plants such as the red-flowered Island snapdragon (*Galvesia speciosa*). The eastern

The lower slopes of the island, particularly the western flat areas, are covered with a dry or desertlike maritime desert-scrub vegetation composed of boxthorn (*Lycium californicum*), prickly pear cactus (*Opuntia littoralis*), coast cholla, and velvet cactus (*Bergerocactus emoryi*). Finally, a dune system exists on the northwestern part of the island. Vegetation there includes beach suncup (*Camissonia cheiranthifolia*), insular rattle-weeds (*Astragalus miguelensis* and *A. nevinii*), beach bur (*Ambrosia chamissonis*) and the endemic San Clemente Island suncup (*Camissonia guadalupensis* ssp. *clementina*). Shrub vegetation as we know it on the Southern

California mainland—chamise (*Adenostoma fasciculatum*), buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*) and ceanothus (*Ceanothus megacarpus*)—is nearly nonexistent on San Clemente Island due to goat grazing. However, a few isolated individual plants still exist on steep cliffs.

## ENDEMIC PLANTS

San Clemente Island contains a greater number of endemics than any other Southern California island. Fourteen species and varieties of plants are known only from San Clemente Island, and another 34 species and varieties, called insular endemics, are found only on the Southern California islands. Many of the plants that are now very rare and found only on the steep out-of-reach areas probably were dominants prior to the introduction of the goats. Some of the more unusual endemics include a gray-leaved, yellow-flowered Indian paintbrush (*Castilleja grisea*), two larkspurs (white *Delphinium kinkiense* and violet *D. variegatum* ssp. *thornii*), the giant buckwheat (*Eriogonum giganteum* var. *formosum*) and the recently rediscovered woodland star (*Lithophragma maximum*), presumed extinct for 40 years.

Other unusual endemics are a woody stephanomeria-type plant (*Munzothamnus blairii*), a brodiaea-like plant (*Tripteleia clementina*), and a beautiful, silver-leaved lotus (*Lotus argophyllus* ssp. *adsurgens*). A number of these and other insular endemics would make excellent horticultural additions, including the silver-leaved shrub *Eriophyllum nevinii*, the bushy tarweed *Hemizonia clementina*, and the Island snapdragon. These plants are available in specialized native plant nurseries and the Malva rosa (*Lavatera assurgentiflora*), a native of the Channel Islands, is already widely planted on the mainland.

## WILDLIFE

The wildlife on San Clemente Island is quite diverse, considering it was never connected to the mainland. Native wildlife includes a relatively common and remarkably tame endemic race of Island fox; two lizards; a deer mouse; two endemic races of birds (the Island loggerhead shrike and Island sage sparrow), as well as a number of more com-



mon species of birds. Six types of birds, the bald eagle, osprey, peregrine falcon, Bewick's wren, rufous-sided towhee, and song sparrow, are now extinct. The Island night lizard (*Klauberina riversiana*), which occurs also on San Nicolas and Santa Barbara islands, is a long-lived relict species from earlier periods and, like the Island ironwood (*Lyonothamnus floribundus*), had close relatives present on the mainland in the distant past.

The feral (wild) goats have naturalized on the island and left a strong presence. Hoof-cut trails crisscross every slope. During the goat's heyday, when over 10,000 roamed the island, the deep canyons smelled of goat dung and the rotting carcasses of those that died of natural causes. Goat bones and mummified hides frequently could be found at the canyon bottoms. The immense impact of the goats on the island will never be obliterated, and healing will take decades, even centuries, but only if every goat is removed. The effects of the efforts to eliminate the goats are already evident. The vegetation shows signs of change and a long-thought-extinct Island rock cress (*Sibara filifolia*) has been discovered on San Clemente Island. Those concerned with natural history must support efforts by the Navy to eliminate the last few goats so that they do not repopulate the areas now being reclaimed by natural processes.

Feral pigs, mule deer, feral cats, Gambel's quail and chukar, rats and house mice also have been introduced, both accidentally and intentionally. Feral pigs destroy native bulbous plants, "plowing" areas to obtain them, and cats, rats and mice cause great damage to nesting birds and compete with native deermice. Fortunately, the mule deer on San Clemente died off before they became an environmental nuisance.

#### PRISTINE SAN CLEMENTE ISLAND

We can attempt to piece together what San Clemente Island must have been like, knowing what little we do of its predisturbed state and the remnant populations of plants and animals. The steep eastern scarp would have been almost entirely a woodland similar to the sparse one that exists there now, but it would have been extremely lush and verdant with wood ferns (*Dryopteris*



San Clemente Island larkspur, an island endemic.

*arguta*), oaks (*Quercus*), toyons (*Herteromeles arbutifolia*), ironwoods, and cherries (*Prunus*). Such herbaceous plants as the woodland star and California saxifrage (*Saxifraga californica*) would have been relatively common. The

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*Many plants now very rare were probably dominants before the introduction of goats.*

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northern slopes and bottoms of the western canyons would have had similar vegetation, with small trickling streams flowing well into the summer.

The southern end of the island would have been covered with a dry or desert-like form of coastal sage scrub. This vegetation would have wrapped around the middle elevations of the entire island, dominated by California sagebrush, coyote bush (*Baccharis pilularis*), California encelia (*Encelia californica*), giant buckwheat, and possibly *Eriophyllum*. Large grovelike areas of *Malva rosa* apparently existed in this community in

both northern and southern regions. A chaparral community of chamise, *Ceanothus*, and bush poppy (*Dendromecon*) also would have existed in scattered locations above the Coastal sage scrub on sandier soils and north-facing slopes. The flat areas on the western side of the island and even the low eastern side would have had vegetation similar to that of the present: a maritime desert scrub with boxthorn and cacti as dominants, a community in which even goats have probably had little effect. The upper areas would have supported some native bunchgrasses including the extinct *Disanthelium californicum*, but the grassy areas would have been much reduced in area by the coastal sage scrub and *Lavatera*. Spring wildflower displays, which are now meager at best, would have contained large patches of goldfields, *Gilia*, lupines, larkspur, and even wind poppies (*Stylomecon*).

Who knows what species that were originally dominant have become extinct without a trace?

#### CONCLUSION

Within the last two decades, management of the California Channel Islands has taken a new direction. Welcome efforts have been undertaken to remove the feral animals, and several of the endemic plants have been listed by the U.S. Fish and Wildlife Service as endangered. The U.S. Navy has taken a positive attitude toward the protection of the island's unique holdings and its resources. One hopes the proposals to use San Clemente Island as a trash and waste dump will never be seriously considered. I for one look forward to future visits to San Clemente Island to observe the recovering biota. ♡

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*Thomas Oberbauer is a regional planner with the San Diego County Planning Department. He has an M.A. in biology and training in botany and zoology. He is interested in the natural history of San Diego County and Southern California, with an emphasis on islands, and has accompanied environmental survey teams to the California Channel Islands. Tom has contributed to California Gardens, Fremontia, and Madroño magazines.*

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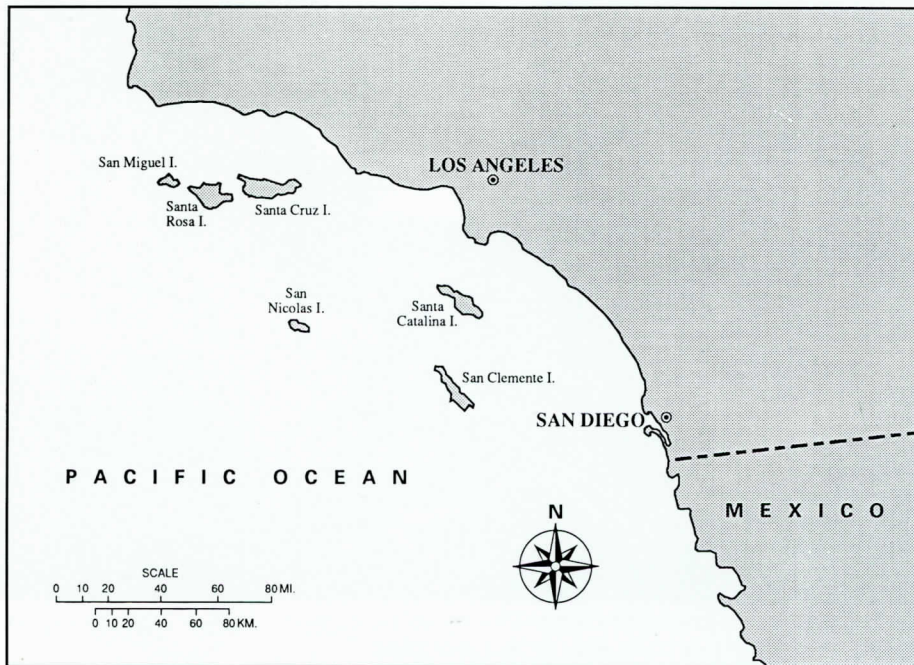


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